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Application Number	10/012,210
Filing Date	November 5, 2001
First Named Inventor	Stephen V.R. Hellriegel
Art Unit	2841
Examiner Name	Tuan T. Dinh
Attorney Docket No.	901115.435

ENCLOSURES (*check all that apply*)

- ☐ Fee Transmittal Form
  - ☐ Fee Attached
- ☐ Amendment/Response
  - ☐ After Final
  - ☐ Affidavits/declaration(s)
- ☐ Extension of Time Request
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- ☐ Information Disclosure Statement and Transmittal
- ☐ Cited References
- ☐ Certified Copy of Priority Document(s)
- ☐ Response to Missing Parts under 37 CFR 1.52 or 1.53
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SIGNATURE OF APPLICANT, ATTORNEY, OR AGENT

Firm Name	Seed Intellectual Property Law Group PLLC	Customer Number	00500
Signature			
Printed Name	Harold H. Bennett II		
Date	February 23, 2006	Reg. No.	52,404

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EXPRESS MAIL NO. EV447227670US

PATENT

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

Applicants	:	Stephen V.R. Hellriegel et al.
Application No.	:	10/012,210
Filed	:	November 5, 2001
For	:	ELECTRICAL CONNECTOR WITH STRAIN RELIEF STRUCTURE

Examiner	:	Tuan T. Dinh
Art Unit	:	2841
Docket No.	:	901115.435
Date	:	February 23, 2006

Mail Stop Appeal Brief - Patents
Commissioner for Patents
P.O. Box 1450
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APPELLANT'S REPLY BRIEF 37 C.F.R. 1.192

Commissioner for Patents:

This reply brief is in furtherance of the Notice of Appeal, filed in this case on April 12, 2005. Applicants hereby request any fees necessary for acceptance of this Reply Brief be charged to Deposit Account No. 19-1090.

The syntax of the Examiner's written English is occasionally fragmented or discontinuous; nevertheless, applicants believe that the intent is generally understandable. Accordingly, in referring to, or quoting statements by the Examiner, efforts are made to render the text using standard construction and syntax to show applicants' understanding of the meaning. In the event that a passage has been misunderstood, applicants respectfully request clarification so that an appropriate reply can be submitted.

I. Rejections under 35 U.S.C. § 112

In the Examiner's Answer of December 23, 2005, the Examiner is silent with respect to the applicants' arguments regarding rejections under 35 U.S.C. § 112. Applicants presume that this indicates that the Examiner does not intend to maintain these rejections.

II. Reply to Examiner's Arguments

Applicants wish to briefly focus on three statements by the Examiner with which there is strong disagreement. The first statement is on page 7 of the brief, under the heading *Response to Argument* subpart (I). The Examiner states that "the organic carrier, prior to being thermally deformed, is inherently flexible to some degree. Since the applicant does not specify how flexible the substrate is, the carrier meets the claim, so that the carrier can flex due to deformation during solder reflow."

The Examiner has misinterpreted the term *flexible* in stating that organic carriers are inherently flexible. The "PTO applies to verbiage of the proposed claims the broadest reasonable meaning of the words in their ordinary usage *as they would be understood by one of ordinary skill in the art.*" *In re Morris,* 127 F.3d 1048, 1054-55, 44 USPQ2d 1023, 1027-28 (Fed. Cir. 1997) (emphasis added). The Examiner's position requires that one of ordinary skill would consider the term *flexible* to be redundant when applied to organic laminate chip carriers, since, if such carriers are inherently flexible, the term would not add information.

The question of whether one of ordinary skill in the art would consider organic laminate carriers to be inherently flexible can be easily resolved by looking to the Furnival reference (U.S. 3,977,074), cited by the Examiner in the present case. Furnival states, "FIG. 1 shows a printed circuit substrate 10 preferably of the *rigid* variety and utilizing *any conventional circuit board material,*" and later states, "the conductors 30 on the opposite side of the substrate are preformed on a separate *flexible* substrate" (see column 1, lines 1-3, 52, and 53; emphasis added).

Furnival does not consider conventional circuit board material to be inherently flexible, since it distinguishes between flexible and rigid types in the specification, and considers them to be different from each other. While Furnival does not mention organic laminate specifically, it is well known in the art that organic laminate material is perhaps the most common class of substrate material available for chip carriers and circuit boards. To one of

ordinary skill in the art, the term *flexible* clearly has a specific meaning when applied to substrates of the types under discussion, and is not regarded as inherent.

contrary to the Examiner's position, the Markovich's chip carrier does not flex (i.e., bend) during reflow, but rather swells due to thermal expansion, then returns to its original thickness when it cools.

"In relying upon the theory of inherency, the examiner must provide a basis in fact and/or technical reasoning to reasonably support the determination that the alleged inherent characteristic necessarily flows from the teachings of the applied prior art." *Ex parte Levy,* 17 USPQ2d 1461, 1464 (Bd. Pat. App. & Inter. 1990) (emphasis in original). "The fact that a certain result or characteristic may occur or be present in the prior art is not sufficient to establish the inherency of that result or characteristic." *In re Rijckaert*, 9 F.3d 1531, 1534, 28 USPQ2d 1955, 1957 (Fed. Cir. 1993).

Applicants note that each independent claim recites a flexible substrate, and neither Markovich nor Furnival teach or suggest this limitation. On this basis alone, each of the claims is allowable.

Referring now to the last paragraph of page 7, the Examiner states that "according to the specification on page 6, lines 21-22, the applicant defines 'strain relief structure' as 'an aperture that extends through the substrate.'" The Examiner then proceeds to indicate that, since Markovich has plated through holes (PTH), these anticipate the strain relief structure limitation.

Contrary to the Examiners statement, *strain relief structure* is not defined in the cited passage. Instead, an example of such a structure is provided. The passage states that, "[a]ccording to a preferred embodiment, the strain relief structures 52 are apertures that extend completely through the flexible substrate material." The specification proceeds to provide further explanation of how such structures function, and how different configurations provide different results (see, for example, Figure 9 and the accompanying text at page 8, lines 14-19; page 9, lines 16-29, and pages 10 and 11 and the referenced figures). Much of this material is reviewed in the Appeal Brief filed October 6, 2005 (see, in particular, pages 7-10).

Claim 1 recites "a strain relief structure." The fact that a strain relief structure may be in the form of an aperture is not the same as saying that any aperture will function as a strain relief structure. In particular, the plated through-holes cited by the Examiner are actually

strain *causing* structures, and do not, themselves, relieve strain: "the deformation takes primarily place at the location of the plated through-hole (PTH) 10 and extend radially therefrom" (column 5, lines 3-5). See, also, the Appeal Brief, beginning at page 15, which discusses the matter further. The plated through-holes of Markivich cannot anticipate the strain relief structure of claim 1.

Referring, finally, to the Examiner's statement on page 8 in subpart (II), the Examiner argues that Markovich teaches a thinning of the substrate as anticipating claims 4 and 5. The Examiner states that Markovich discloses "a chip carrier having the PTH (10) formed in a thinned region after the reflow of the carrier." It appears that the Examiner is fundamentally confused about Markovich's structure, and the order of operation.

To clarify: first, a substrate is provided with plated through-holes, as shown in Figure 4a. This is a hole drilled in the laminate that is then plated internally with metal to provide a conductive path through the hole, forming a metal tube in the hole. A chip is then positioned on the top, with solder balls that were previously formed on the bottom of the chip being placed in contact with pads 12 on the carrier. The reflow step is one in which the carrier is heated to a temperature sufficient to cause the solder balls to re-melt and flow out to adhere between the carrier and the chip, forming the necessary electrical connections. This is the "reflow" step referred to. During this step, the laminate carrier and the metal plating expands due to the heat of the reflow step. Because the laminate has a higher coefficient of thermal expansion, it expands more than the metal tube. This results in a distortion of the surface of the laminate, as shown in Figure 4b. The surface is actually flexed down into the funnel shape by the difference in expansion. Any surface plating that is near this distortion - the contact indicated at 20 in Figure 5b, for example - is in danger of delaminating, or peeling up. However, once the laminate cools, it returns to its original thickness, and the distortion disappears. The area cited by the Examiner as anticipating the thinned region of claim 4 is merely a transitory change, and cannot anticipate the claim.

Much of this process is not explained in detail in Markovich, since it is very well known in the industry, and would be self evident to one of ordinary skill. The background of the invention does provide some information.

The Examiner has suggested that the plated through-holes are formed after the reflow step, in the thinned region formed by the reflow. This is absolutely wrong, since the problem that Markovich addresses is the distortion caused by the plated through-holes during reflow. Without the holes, there is no issue to resolve.

III. SUMMARY

Applicant requests that the Examiner's rejection be reversed and that the claims be allowed for the reasons stated herein as well as the reasons Appeal Brief filed in October of 2005 (as a response to Notice of Non-compliant Appeal Brief).

Respectfully submitted,
Stephen V.R. Hellriegel et al.
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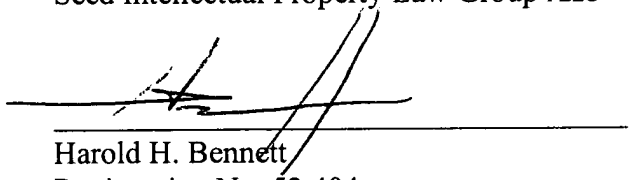

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